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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 10/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/060,737	Applicant(s) HUANG ET AL	
	Examiner Jennifer A. Leung	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,8,10-12,14,15,17-35 is/are pending in the application.
- 4a) Of the above claim(s) 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,8,10-12,14,15,17-19 and 21-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on July 8, 2004 has been received and carefully considered. Claims 27-35 are newly added. Claims 6, 7, 9, 13 and 16 are cancelled. Claim 20 is withdrawn. Claims 1-5, 8, 10-12, 14, 15, 17-19 and 21-35 are active.

Claim Objections

2. Claims 29-31 and 33-35 are objected to because of the following informalities:
In claims 29 and 33, the structural limitation applicant is attempting to recite is incomplete (see lines 1 and 2, wherein "... a membranous pad includes a plurality of --?-- "). Additionally, in claims 29-31 and 33-35, the word "includes" in line 2 should be changed to the word -- including --, or the word -- having --, for proper grammatical form. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-5, 8, 10-12, 14, 15, 17-19 and 21-35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 1, the newly added structural limitation of, "said structure including non-porous materials for increasing surface adhesion of the non-pressurized fluid reactant and

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flow of the fluid,” constitutes new matter, as it is unclear as to where the support for such limitation can be found in the specification and drawings. Also, as disclosed in the specification, page 11, section [0049], the “structure” appears to comprise an evaporative pad 5, which is “a thin membrane fabricated by MEMS technology and contains *micro holes* and grooves to enhance chemical flow through surface adhesion.” Thus, the specification contradicts the claim to an evaporator structure comprising “non-porous materials”, as evidenced by the pores defined by the disclosed *micro holes*. A pore is inherently defined as a small hole or passage.

Regarding claim 27, the newly added limitation of, “the chamber being formed to permit resonation in said chamber with a standing wave,” constitutes new matter, as it is unclear as to where the support for such limitation can be found in the specification and drawings. Also, it is unclear as to what structure enables said chamber to “permit resonation with a standing wave.” For instance, is it the placement of the inlets and outlets? The size of the chamber? The placement of the chamber relative to the evaporator? The provision of an exhaust nozzle?

Regarding claim 32, the newly added limitation of, “wherein the evaporator includes a structure for precluding an external power source,” constitutes new matter, as it is unclear as to where the support for such limitation can be found in the specification and drawings. In essence, the “initiator” as claimed by Applicants is inherently an external power source.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-5, 8, 11, 12, 14, 19, 21 and 23-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Young et al. (US 6,162,046).

Regarding claims 1, 11, 21 and 27-35, Young et al. discloses an apparatus comprising: walls forming a chamber having an outlet (i.e., passageway **104**, defining a mixing chamber **100** and having a combustion zone **106** at its outlet; FIG. 4; column 16, lines 39-61); an evaporator (i.e., a vaporization zone comprising porous member **62** and hot seat assembly **72**; FIG. 3, 4; column 14, lines 24-45) adjacent and gaseously connected to chamber **100/104** for evaporating a fluid reactant supplied through a non-pressurized inlet (i.e., liquid fuel within ambient pressure reservoir **34** supplied through inlets/cutouts **56**; column 12, lines 24-37) and introducing the evaporated fluid reactant into the chamber **100/104**; a feed path for supplying the fluid reactant to the evaporator (i.e., via wick **50** within shroud **52** of the liquid feed system; FIG. 3, 4; column 13, line 12 to column 13, line 8); and an initiator for igniting the evaporated fluid reactant in the chamber (see column 17, lines 30-40); wherein the evaporator includes a structure that comprises non-porous materials (i.e., the hot seat assembly **72** comprising vapor permeable members **74** and **76**, constructed, for example, from copper or a copper alloy, or other material having a high thermal conductivity; FIG. 3, 5A-C; column 14, lines 23-45; column 15, line 46 to column 16, line 2) having formations for increasing surface adhesion of the non-pressurized fluid reactant and flow of the fluid (i.e., via a plurality of patterned parallel grooves **82** and through holes **84**); wherein the chamber **100/104** is *inherently* formed to permit resonation in said chamber with a standing wave (i.e., as evidenced by the “adjustable combustion output feature”, wherein

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“The combustion output is generally modulated by increasing or decreasing the flow of vaporized and pressurized fuel into the burner assembly,” accomplished by, “modulating the heat flux in the combustion apparatus, and more particularly involves modulating the amount of heat energy returned to the vaporization/pressurization module,” see column 17, lines 41-62); and

wherein the evaporator includes a structure for precluding an external power source (i.e., a heat source comprising the hot seat assembly **72**, wherein, “Alternatively and preferably, the heat source utilizes heat energy returned from the heat of combustion *without requiring any input from or connection to an external power source*,” column 15, lines 25-33; see also column 17, lines 10-29).

Regarding claim 2-5, Young et al. discloses a first inlet (i.e., via supply channel **102**; FIG. 4; column 16, lines 40-61) for introducing a non-pressurized oxidizer (i.e., ambient air) into the chamber **100/104** for forming a mixture of the evaporated fluid and the oxidizer; wherein the initiator provides the energy to combust **106** the mixture of the evaporated fluid and the oxidizer, inherently sending a pressure wave through an outlet (see column 17, lines 30-61).

Regarding claim 8, Young et al. discloses the feed path **50, 52** (FIG. 2, 3) comprises at least one channel (i.e., a plurality of capillary tubes; column 13, lines 12-40) for delivering the fluid to the evaporator.

Regarding claims 12 and 14, Young et al. discloses the reactant fluids comprising at least two different fluids (column 6, lines 30-44) supplied to the evaporator by at least two separate inlets (i.e., the plurality of capillary tubes in feed path **50, 52** via inlets **56**; column 13, lines 12-40), wherein the oxidizer is a gas supplied from outside the device (i.e., air at ambient

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temperature and pressure; FIG. 4; column 16, lines 40-61) and introduced to chamber **100/104** through an inlet passing through the walls of the chamber (i.e., via combustion gas supply channel **102**) for mixing with the two different evaporated fluids within chamber **100/104**.

Regarding claims 19 and 26, no valves, chemical pumps, pressurized chemical lines, pumps or moving mechanical parts are required for device operation (column 6, lines 54-61; see also column 3, lines 33-38).

Regarding claims 23-25, no further structural limitations are recited, since the "acoustic wave", "wavefront" and "pulsating wave characteristic" are not considered elements of the apparatus, but process limitations relating to the intended use of the apparatus. Therefore the apparatus of Young et al. meets the claims. In any event, the wave characteristics are inherently controllable in the apparatus of Young et al., as evidenced by, "an adjustable combustion output feature," for modulating the combustion output by increasing or decreasing the flow of fuel to the combustion zone (column 17, lines 41-61; see also, column 5, lines 31-33).

Instant claims 1-5, 8, 11, 12, 14, 19, 21 and 23-35 structurally read on the apparatus of Young et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 10, 17, 18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young et al. (US 6,162,046).

Regarding claim 10, Young et al. discloses the evaporator may comprise, “[f]ibrous materials such as fiberglass mats, other types of woven and non-woven fibrous materials, and porous ceramic, low conductivity porous or fibrous metallic materials and porous metal/ceramic composites,” (column 10, lines 37-55). Young et al. further discloses the chamber comprising, “a rigid material having a generally high thermal conductivity, such as a copper or copper alloy,” (column 16, lines 57-61), and the initiator comprising, “[v]arious ignition systems, including catalytic initiation systems... adapted for use in combustion apparatus of the present invention,” (column 17, lines 30-40).” However, Young et al. is silent as to the materials for the chamber and initiator comprising, specifically, “silicon, plastic, ceramic, and glass based material.” In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate material, such as the recited materials, for the components of the apparatus of Young et al., on the basis of suitability for the intended use and absent showing any unexpected results, because the use of such materials in high temperature or combustion apparatuses is well known in the art.

Regarding claims 17 and 18, Young et al. discloses,

“A steady state condition can be achieved and maintained wherein liquid fuel provided to the liquid feed surface of the porous member at substantially ambient pressures and temperatures is heated and pressurized within the vaporization/pressurization module using a portion of the heat generated in the burner to produce one or more pressurized

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vapor jets(s), which in turn are used for combustion,” (column 5, lines 53-60).”

Although Young et al. is silent as to the apparatus comprising at least one temperature sensor and at least one pressure sensor, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such sensors to the apparatus of Young et al., on the basis of suitability for the intended use and absent showing any unexpected results, since the provision of temperature and pressure sensing elements to control systems for enabling the detection and subsequent control of process variables to a steady state is well known in the art.

Regarding claim 22, Young et al. discloses the evaporator preferably delivers vapor to the chamber **100/104** at a pressure greater than the pressure of liquid feed; the liquid feed pressure being substantially atmospheric (column 9, lines 25-36, 60 to column 10, line 14). Young et al. further disclose,

“... the *degree of vapor pressurization*, and amount of pressurized vapor released from the vaporization/ pressurization module may be modulated, for example, by varying the pore size of the porous member, by providing porous members having different thermal conductivity properties, by changing the configuration or arrangement of porous member **14**, by varying the number, size and/or location of vapor permeable apertures in the substantially vapor impermeable barrier, by modulating the amount of vapor release, and/or by adjusting the amount of heat provided to the vaporization zone,” (column 11, line 48 to column 12, line 6).

Young et al., however, is silent as to whether the chemical may be delivered to the chamber in a non-pressurized state. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the evaporator of Young et al. to deliver the chemical to the chamber in a non-pressurized state, on the basis of suitability for the intended use, by merely varying the number, size and/or location of vapor permeable apertures, for instance, to allow for equalization of flow into and out of the evaporator, because it has been

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held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (also, column 18, lines 13-49).

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Young et al. (US 6,162,046) in view of Loeb (US 1,753,897).

Young et al. discloses that the combustion may be initiated by, “[h]eating the burner assembly for a few seconds using a match or a lighter,” and furthermore, “[v]arious ignition systems... may *alternatively be adapted* for use in combustion apparatus of the present invention,” (column 17, lines 30-40). Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate, alternative ignition system (i.e., such as the instantly recited “spark or glow wires”) for the initiator in the apparatus of Young et al., on the basis of suitability for the intended use, because such initiators are well known in the art, as evidenced by Loeb (the same comments apply, see above), and furthermore, substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

Response to Arguments

7. In view of Applicant’s amendments to independent claim 1, the rejection of claims 1-5, 11, 15, 19, 22, 23 and 26 under 35 U.S.C. 102(b) as being anticipated by Loeb (US 1,753,897) has been withdrawn.

8. Applicant’s arguments with respect to the rejection of claims 1-5, 7, 8, 10-12, 14, 15, 17-19 and 22-26 under 35 U.S.C. 102(e) or 35 U.S.C. 103(a) as being anticipated by, or unpatentable over, Young et al. (US 6,162,046) have been fully considered but they are not

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persuasive. Beginning with the last paragraph on page 7, applicants argue,

“... in FIG. 3 of Young, is a pressurization module 60 including porous member 62, vapor impermeable shroud 64, and substantially vapor impermeable plate 66... the purpose of Young’s apparatus is to pressurize the fuel vapor for supplying fuel to downstream devices... Thus, the pressurization module is equivalent to having a pressurized chemical line or pump found in macro-scale engines... In contrast, in the present invention... the fluid reactants are supplied through a non-pressurized inlet.”

The Examiner respectfully disagrees and contends that Applicant’s arguments are not commensurate with the current language of the claims. As instantly recited in claims 1, 27 and 32, the device comprises,

“an evaporator adjacent the chamber for evaporating a fluid reactant supplied through a non-pressurized inlet and introducing the evaporated fluid reactant into the chamber...”

As claimed, *the evaporator* comprises a *non-pressurized inlet* for a supply of fluid reactant.

However, Applicant argues for *the chamber* to comprise a non-pressurized inlet, or in other words, an evaporator having a *non-pressurized outlet*. The feature upon which applicant relies (i.e., the evaporator having a non-pressurized outlet) is not recited in the rejected claim(s).

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Therefore, the apparatus of Young et al., which comprises an ambient pressure fuel reservoir 34 for supplying the vaporization zone 62/72 (see column 14, lines 24-45) with fuel under ambient pressure, structurally meets the claims.

Additionally, on page 8, applicants argue,

“... the system in Young includes a porous member 62 for assisting evaporation of fuel and a hot seat assembly 72 for channeling the vapor fuels. The design of the porous member is such that the system of Young requires substantial external power in the form of heat... In contrast, the device of the present system includes a structure that is

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not a porous member, and hence precludes the need for an external heat source... the structure includes specifically designed patterned holes and grooves to increase surface adhesion, in a predetermined manner, thereby permitting evaporation without the need for an external power source."

The Examiner respectfully disagrees. As noted in the rejection above and restated herein, the apparatus of Young et al. does not require the provision of an external power source for enabling the evaporation of the liquid feed. In column 15, lines 24-33, Young et al. disclose,

"Vaporized fuel exit surface **70** of porous member **62** is preferably in proximity to and in thermal communicating with a heat source providing heat energy for vaporizing the liquid fuel in or at the surface of the porous member. The heat source may employ an external power source, such as the electrical heating element illustrated in FIG. 1. *Alternatively and preferably*, the heat source utilizes heat energy returned from the heat of combustion *without requiring any input from or connection to an external power source.*"

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

As set forth in 37 CFR 1.136(a), a shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

* * *


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449.

The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
September 30, 2004 


HIEN TRAN
PRIMARY EXAMINER